FACT SHEET FOR NPDES PERMIT WA0040533
Port of Olympia/Cascade Pole Site Remediation
April 2010

PURPOSE of this Fact Sheet

This fact sheet explains and documents the decisions Ecology made in drafting the proposed National Pollutant Discharge Elimination System (NPDES) permit for Port of Olympia/Remediation.

The Environmental Protection Agency (EPA) developed the NPDES permitting program as a tool to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." EPA delegated to Ecology the power and duty to write, issue, and enforce NPDES permits within Washington State. Both state and federal laws require any industrial facility to obtain a permit before discharging waste or chemicals to a water body.

An NPDES permit limits the types and amounts of pollutants the facility may discharge. Those limits are based either on (1) the pollution control or wastewater treatment technology available to the industry, or on (2) the receiving water's customary beneficial uses. This fact sheet complies with Section 173-220-060 of the Washington Administrative Code (WAC), which requires Ecology to prepare a draft permit *and accompanying fact sheet* for public evaluation before issuing an NPDES permit.

PUBLIC ROLE in the Permit

Ecology makes the draft permit and fact sheet available for public review and comment at least 30 days before issuing the final permit to the facility operator (WAC 173-220-050). Copies of the fact sheet and draft permit for Port of Olympia, NPDES permit WA0040533**,** are available for public review and comment from insert month day, year until the close of business month day, year. For more details on preparing and filing comments about these documents, please see **Appendix A - Public Involvement**.

Before publishing the draft NPDES permit, the Port of Olympia reviewed it for factual accuracy. Ecology corrected any errors or omissions about the facility's location, product type or production rate, discharges or receiving water, or its history.

After the public comment period closes, Ecology will summarize substantive comments and our responses to them. Ecology will include our summary and responses to comments to this Fact Sheet as **Appendix D - Response to Comments**, and publish it when issuing the final NPDES permit. Ecology will not revise the rest of the fact sheet, but the full document will become part of the legal history contained in the facility's permit file.

Mohsen Kourehdar, P.E. prepared the permit and this fact sheet.

SUMMARY

The Port of Olympia (the Port) has operated a groundwater pumping and treating system that discharges into Inner Budd Inlet via Lacey, Olympia, Tumwater and Thurston County (LOTT)'s outfall/diffuser since 1993.

The proposed permit regulates a discharge of treated groundwater and stormwater from a Model Toxics Control Act (MTCA) site. This site is located in Olympia, Washington. Ecology issued the original permit in 1993 and renewed it in 2002.

Ecology based the proposed permit limits on seven years of effluent data for Poly Aromatic Hydrocarbons (PAHs), Pentachlorophenol (PCP), Copper, Total Suspended Solids (TSS) and pH. The Port measured 2, 3, 7, 8-Tetrachloro dibenzo-p-dioxin in the effluent two times, in 2003 and 2004. Ecology set a performance based permit limit for PCP which is lower than human health water quality criteria for PCP. The proposed permit also includes performance based permit limits for TSS and water quality based permit limits for pH. Ecology will set a final limit for Benzo(a)pyrene after the Port collects data with the lower method detection limit and quantitation level.

This permit also regulates the contaminated stormwater runoff from the North Point/Phase III area during soil remediation/construction.

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I. INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later amendments in 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One mechanism for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), administered by the federal Environmental Protection Agency (EPA). The EPA authorized the state of Washington to manage the NPDES permit program in our state. Our state legislature accepted the delegation and assigned the power and duty for conducting NPDES permitting and enforcement to the Department of Ecology (Ecology). The legislature defined Ecology's authority and obligations for the wastewater discharge permit program in 90.48 RCW (Revised Code of Washington).

Ecology adopted rules describing how it exercises its authority:

- Procedures Ecology follows for issuing NPDES permits (chapter 173-220 WAC)
- Water quality criteria for surface waters (chapter 173-201A WAC) and for ground waters (chapter 173-200 WAC)
- Sediment management standards (chapter 173-204 WAC)
- Submission of Plans and Reports for Construction of Wastewater Facilities (chapter 173-240 WAC)

These rules require any industrial facility operator to obtain an NPDES permit before discharging wastewater to state waters. They also help define the basis for limits on each discharge and for performance requirements imposed by the permit.

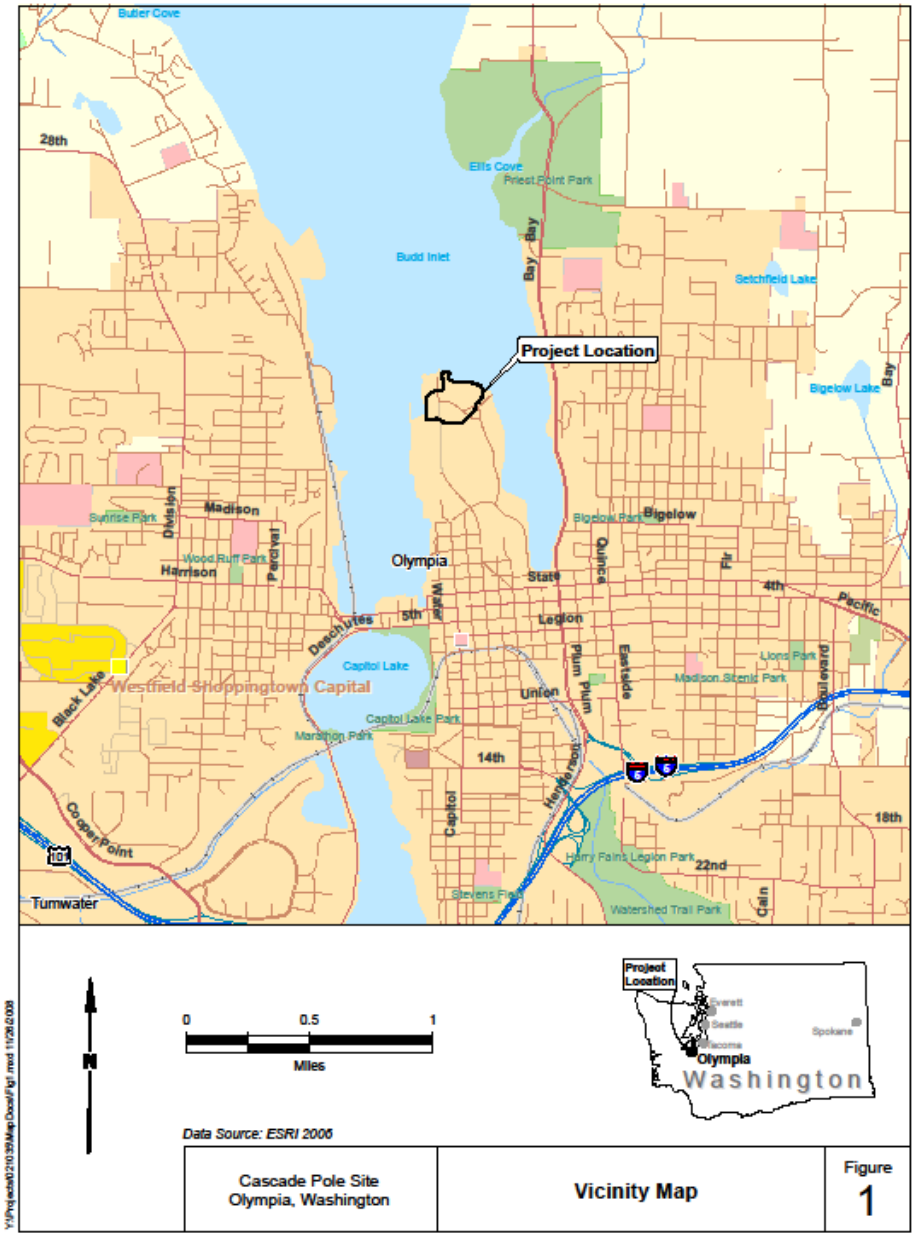
Under the NPDES permit program and in response to a complete and accepted permit application Ecology must prepare a draft permit and accompanying fact sheet, and make them available for public review before final issuance. Ecology must also publish an announcement (public notice) telling people where they can read the draft permit, and where to send their comments, during a period of thirty days (WAC 173-220-050). (See **Appendix A--Public Involvement** for more detail about the Public Notice and Comment procedures). After the Public Comment Period ends, Ecology may make changes to the draft NPDES permit in response to comments. Ecology will summarize the responses to comments and any changes to the permit in **Appendix D.**

II. BACKGROUND INFORMATION

Table 1 - General Facility Information

Applicant:	The Port of Olympia
Facility Name and Address:	Cascade Pole Remediation 1503 Marine Drive NE Olympia, WA 98501
Type of Treatment:	Equalization and Phase Separation, Bio-Reactor, Clarifier, and Carbon Filters
SIC Code	Model Toxics Control Act (MTCA) Site
Discharge Location:	Inner Budd Inlet via LOTT Outfall/Diffuser Latitude: 47.058333 Longitude: 122.9025

Figure 1: Site Location.



A. Facility Description

History

The upland Cascade Pole site (Figure 1) is located on an 18-acre parcel owned by the Port. Various plant owners/operators used the site for wood treating operations from about 1939 through 1986. Prior to the 1960s, creosote was the primary wood preservative used at the treatment facility. Creosote is composed of polynuclear aromatic hydrocarbons (PAHs). Beginning in 1967, Cascade Pole Company (CPC) used

pentachlorophenol (PCP) dissolved in a carrier oil to treat poles. Copper may have been used as a wood preservative in the 1940s. CPC owned and operated the facility from 1967 until it permanently terminated operations in October 1986. Structures and equipment were removed in September 1990.

Under the Model Toxics Control Act (MTCA), Chapter 70.105D RCW, the CPC, Port, and Ecology negotiated two consent decrees and agreed orders to further investigate and remediate soil, sediment, and groundwater contaminated by wood treating chemicals from the former CPC facility at the Port.

In 1993, the Port installed a 350 foot sheet pile wall along the shoreline to prevent release of wood treating product from the site into Budd Inlet. In 1997, the Port constructed an underground slurry wall 3528-ft. (0.670 miles) long with an average depth of 23 feet. The slurry wall enclosed 18 acres surrounding the site. The slurry wall and the sheet pile wall are tied together to eliminate the subsurface migration of contamination. Also in 2001-2002, the Port removed approximately 40,000 cubic yards of contaminated sediment from Budd Inlet and stored it in the sediment containment cell on the upland part of the site. The consent decree required the Port to design and construct a groundwater extraction and treatment system to provide hydraulic gradient control, recovery of light nonaqueous phase liquids (LNAPL), and extraction and treatment of aqueous phase contamination.

The groundwater extraction system consists of 11 extraction wells. The total extraction flow rate is about 8-10 gallons/minute (gpm). The Port controls the groundwater extraction rate to ensure a hydraulic gradient is maintained inward toward the containment area. In addition to treated groundwater, the treated stormwater from the North Point/Phase III area during contaminated soil excavation/transport/construction, and stormwater from the treatment system secondary containment area will also be regulated with this NPDES permit. The stormwater from the North Point/Phase III area will be temporary and is limited to soil remediation period. Once the remedial action is concluded and contaminated soil is removed, there will not be any contaminated soil contact stormwater generated from the North Point/Phase III area.

Wastewater Treatment

The groundwater treatment system consists of phase separation, biological treatment, clarification, filtration, and granular activated carbon (GAC). Extracted nonaqueous phase liquids (NAPL) is pumped into a phase separation tank where NAPL and aqueous phase are separated. Both LNAPL and DNAPL are removed and disposed. The Port pumps the aqueous phase from the NAPL separation process, and contaminated groundwater extracted by the aqueous phase pumps located in each well into an equalization tank. The equalized aqueous phase flow then enters a fixed film biological system where bacteria and various microbes degrade organic contaminants. The biological system consists of two submerged fixed film bioreactors in parallel. Solids in the effluent from the bioreactors are removed by a parallel plate clarifier followed by four particulate filters in parallel. Finally, the effluent is filtered with GAC before discharge. The GAC system consists of two GAC canisters in series. Sludge from the bioreactor and filter elements are disposed of off-site. The groundwater treatment system is designed to treat approximately 20 gallons/minutes (gpm). Since 1993, the Port has processed approximately 100 million gallons of contaminated groundwater.

The stormwater from the North Point/Phase III area will be collected and treated by settling tanks, multimedia filtration and activated carbon filters. This system will be operated by a contractor. The permit requires submittal of an engineering design report for the stormwater treatment system.

The stormwater from the treatment system secondary containment area will be treated with the existing groundwater treatment system.

Figure 1 in Appendix C shows the flow diagram of the existing groundwater treatment systems.

Discharge Outfall

The effluent discharges into Budd Inlet via LOTT's outfall. The design flow for the pump and treat system is 20 gpm. The peak stormwater design flow from North Point/Phase III construction area is approximately 150 gpm. This designed flow is 2-year, 1 hour peak flow calculated using Western Washington Hydrology Model (version 3.1). The stormwater runoff from the secondary containment area is approximately 10 gpm (based on 8.1 inches monthly rainfall). The total treated maximum groundwater and stormwater effluent flow is approximately 180 gpm which is equivalent to approximately 2.5 percent of the LOTT's effluent. Ecology calculated this based on an average of 10 million gallons per day of LOTT's effluent and 0.250 million gallons per day of pump and treat and stormwater effluent.

B. Permit Status

The Port of Olympia submitted an application for permit renewal on March 30, 2007. Ecology accepted it as complete on April 18, 2007.

Ecology issued the original permit in January 1993 and renewed it on September 26, 2002. The previous permit placed effluent limits on total PAHs, PCP, and treatment system removal efficiency for PCP of 99.5 percent and pH. The permit also required the Port to monitor for copper, TSS and flow and to measure 2,3,7,8-Tetrachloro dibenzo-p-dioxin semi-annually for one year.

C. Summary of Compliance with Previous Permit Issued

Ecology assessed facility compliance based on its review of the facility's Discharge Monitoring Reports (DMRs), the permit submittals, and an influent/effluent sampling compliance inspection conducted by Ecology staff on November 23, 2009.

The Port of Olympia has complied with the effluent limits and permit conditions throughout the duration of the permit. The only violations were for pH. The Port violated the permit pH limits on July 2005 (reported value 6.98 standard units [s.u.]), October 2006 (reported value 8.98 s.u.), December 2007 (reported value 6.88 s.u.), and September 2009 (reported value 6.87 s.u.). The previous pH permit limit was 7.0-8.5 s.u.

After each violation, Ecology informed the Port of Olympia of the violations via e-mails or violation letters. Each time, the Port responded with the actions taken to correct operational issues and ensure that violations do not happen in future.

Ecology conducted a sampling compliance inspection in November 2009. The results from DMRs and sampling inspection show the Port has learned to operate this treatment facility to meet the permit requirements. The results from the 2009 sampling compliance inspection are in Table 2.

Table 2 - The test results from the compliance inspection conducted in November 2009.

Parameter	Influent Concentration	Effluent Concentration
PCP	37 µg/L	0.061 µg/L[1]
Benzo (a) pyrene	2.4 µg/L	0.020 µg/L[1]
Benzo(a) anthracene	8.7 µg/L	0.0099 µg/L[1]
Benzo(b) fluoranthene	3.6 µg/L	0.0099 µg/L[1]
Chrysene	6.7 µg/L	0.0099 µg/L[1]
Dibenzo(a,h) anthracene	0.14 µg/L	0.0099 µg/L[1]
Benzo(k) fluoranthene	1.2 µg/L	0.0099 µg/L[1]
Indeno(1,2,3-cd) pyrene	0.47 µg/L	0.0099 µg/L[1]
Copper	0.93 µg/L	1.01 µg/L
Turbidity	20.5 NTU	0.5 NTU[1]
Total Suspended Solids	8.0 mg/L	1.0 mg/L

1Quantitation Level (Method Reporting Level)

D. Remediated Groundwater Characterization

The concentration of pollutants in the discharge was reported in the NPDES application and in discharge monitoring reports. The effluent is characterized as follows:

Table 3 - Wastewater Characterization

Parameter	Average Concentration	Maximum Concentration
PCP	<0.10, µg/L[1]	<0.10, µg/L[1]
PAHs	<1.60, µg/L[1]	<1.60, µg/L[1]
pH	7.54 s.u.	8.98 s.u.

[1]<Quantitation Levels (Method Reporting Limits)

E. Description of the Receiving Water

The Port of Olympia/Cascade Pole Site Remediation discharges to Inner Budd Inlet via LOTT's outfall/diffuser.

F. SEPA Compliance

Regulation exempts reissuance or modification of any wastewater discharge permit from the SEPA process as long as the permit contains conditions are no less stringent than state rules and regulations. The exemption applies only to existing discharges, not to new discharges.

III. PROPOSED PERMIT CONDITIONS

Federal and state regulations require that effluent limits in an NPDES permit must be either technology or water quality-based.

- Technology-based limits are based upon the treatment methods available to treat specific pollutants. Technology-based limits are set by the EPA and published as a regulation, or Ecology develops the limit on a case-by-case basis (40 Code of Federal Regulations [CFR] 125.3, and chapter 173-220 WAC).

- Water quality-based limits are calculated so that the effluent will comply with the Surface Water Quality Standards (chapter 173-201A WAC), Ground Water Standards (chapter 173-200 WAC), Sediment Quality Standards (chapter 173-204 WAC) or the National Toxics Rule (40 CFR 131.36).

- Ecology must apply the most stringent of these limits to each parameter of concern. These limits are described below.

The limits in this permit reflect information received in the application and from supporting reports (engineering, hydrogeology, etc.). Ecology evaluated the permit application and determined the limits needed to comply with the rules adopted by the state of Washington. Ecology does not develop effluent limits for all reported pollutants**.** Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation.

Nor does Ecology usually develop permit limits for pollutants that were not reported in the permit application but that may be present in the discharge. The permit does not authorize discharge of the non-reported pollutants. During the five-year permit term, the facility's effluent discharge conditions may change from those conditions reported in the permit application. The facility must notify Ecology, as described in 40 CFR 122.42(a), if significant changes occur in any constituent. Industries may be in violation of their permit until Ecology modifies the permit to reflect additional discharge of pollutants.

A. Technology-Based Effluent Limits

Total Suspended Solids (TSS): The existing permit required testing and reporting of TSS. Ecology calculated performance based permit limits based on this data. This information is shown in Appendix C. The proposed permit includes TSS performance based permit limits of 6.0 mg/L for monthly average and 15 mg/L for daily maximum.

The chemicals of concern (COCs) at this site include PAHs, PCP, and dioxins which have an affinity for particulates. TSS removal is the key to control and remove COCs from discharge.

B. Surface Water Quality-Based Effluent Limits

The Washington State Surface Water Quality Standards (chapter 173-201A WAC) were designed to protect existing water quality and preserve the beneficial uses of Washington's surface waters. Waste discharge permits must include conditions that ensure the discharge will meet established surface water quality standards (WAC 173-201A-510). Water quality-based effluent limits may be based on an individual waste load allocation or on a waste load allocation developed during a basin wide total maximum daily loading study (TMDL).

Numerical Criteria for the Protection of Aquatic Life and Recreation

Numerical water quality criteria are published in the Water Quality Standards for Surface Waters (chapter 173-201A WAC). They specify the levels of pollutants allowed in receiving water to protect aquatic life and recreation in and on the water. Ecology uses numerical criteria along with chemical and physical data

for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limits, the discharge must meet the water quality-based limits.

Numerical Criteria for the Protection of Human Health

The U.S. EPA has published 91 numeric water quality criteria for the protection of human health that are applicable to dischargers in Washington State (40 CFR 131.36). These criteria are designed to protect humans from exposure to pollutants linked to cancer and other diseases, based on consuming fish and shellfish and drinking contaminated surface waters. The Water Quality Standards also include radionuclide criteria to protect humans from the effects of radioactive substances.

Narrative Criteria

Narrative water quality criteria (e.g., WAC 173-201A-240(1); 2006) limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge to levels below those which have the potential to:

- Adversely affect designated water uses.
- Cause acute or chronic toxicity to biota.
- Impair aesthetic values.
- Adversely affect human health.

Narrative criteria protect the specific designated uses of all fresh waters (WAC 173-201A-200, 2006) and of all marine waters (WAC 173-201A-210,; 2006) in the state of Washington.

Antidegradation

The purpose of Washington's Antidegradation Policy (WAC 173-201A-300-330; 2006) is to:

- Restore and maintain the highest possible quality of the surface waters of Washington.
- Describe situations under which water quality may be lowered from its current condition.
- Apply to human activities that are likely to have an impact on the water quality of surface water.
- Ensure that all human activities likely to contribute to a lowering of water quality, at a minimum, apply all known, available, and reasonable methods of prevention, control, and treatment (AKART).
- Apply three Tiers of protection (described below) for surface waters of the state.

Tier I ensures existing and designated uses are maintained and protected and applies to all waters and all sources of pollutions. Tier II ensures that waters of a higher quality than the criteria assigned are not degraded unless such lowering of water quality is necessary and in the overriding public interest. Tier II applies only to a specific list of polluting activities. Tier III prevents the degradation of waters formally listed as "outstanding resource waters," and applies to all sources of pollution.

A facility must prepare a Tier II analysis when all three of the following conditions are met:

- The facility is planning a new or expanded action.
- Ecology regulates or authorizes the action.
- The action has the potential to cause measurable degradation to existing water quality at the edge of a chronic mixing zone.

Because the proposed permit requires the discharge to meet water quality criteria and human health criteria it should not cause a measureable change in the inner Budd Inlet. This facility is also not planning a new or expanded action under this permit, therefore, the Tier II analysis is not required. Ecology's analysis described in this section of the fact sheet demonstrates that the proposed permit condition will protect the existing and designated uses of the receiving water so the facility will meet Tier 1 requirements.

Mixing Zones

A mixing zone is the defined area in the receiving water surrounding the discharge port(s), where wastewater mixes with receiving water. Within mixing zones the pollutant concentrations may exceed water quality numeric criteria, so long as the diluting wastewater doesn't interfere with designated uses of the receiving water body (e.g., recreation, water supply, and aquatic life and wildlife habitat, etc.). The pollutant concentrations outside of the mixing zones must meet water quality numeric criteria.

The effluent discharges into Budd Inlet via LOTT's outfall. LOTT's mixing study report included the critical acute and chronic dilution factors of 35.3 and 48.9 for its outfall, respectively (Draft Mixing Zone Dye Tracer Report, February 2009, by Cosmopolitan Engineering Group, Inc.). This discharge does not need the full dilution provided by the LOTT's outfall. Therefore, Ecology used a chronic dilution factor of 9 to conduct the reasonable potential calculations to determine compliance with pH permit limit of 6.0-9.0 s.u. Ecology also used critical dilution factors of 2 for acute and 3 for chronic to conduct reasonable potential calculations for copper. These calculations are shown in Appendix C.

C. Designated Uses and Surface Water Quality Criteria

Applicable designated uses and surface water quality criteria are defined in chapter 173-201A WAC. In addition, the U.S. EPA set human health criteria for toxic pollutants (40 CFR 131.36). Criteria applicable to this facility's discharge are summarized below in Table 4.

- Aquatic life uses are designated using the following general categories. All indigenous fish and non-fish aquatic species must be protected in waters of the state.

    (a) **Extraordinary quality** salmonid and other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.

    (b) **Excellent quality** salmonid and other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.

(c) **Good quality** salmonid migration and rearing; other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.

(d) **Fair quality** salmonid and other fish migration.

The Aquatic Life Uses for this receiving water are identified below.

Table 4 - Aquatic Life Uses & Associated Criteria

Good quality	
Temperature Criteria – Highest 1D MAX	19°C (66.2°F)
Dissolved Oxygen Criteria – Lowest 1 Day Minimum	5.0 mg/L
Turbidity Criteria	• 10 NTU over background when the background is 50 NTU or less; or • A 20 percent increase in turbidity when the background turbidity is more than 50 NTU.
pH Criteria	pH must be within the range of 7.0 to 8.5 with a human-caused variation within the above range of less than 0.5 units.

- To protect **shellfish harvesting**, fecal coliform organism levels must not exceed a geometric mean value of 14 colonies/100 mL, and not have more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 43 colonies/100 mL.

- The **recreational uses** are primary contact recreation and secondary contact recreation.

The recreational uses for this receiving water are identified below.

Table - 5 Recreational Uses

Recreational use	**Criteria**
Secondary Contact Recreation	Enterococci organism levels must not exceed a geometric mean value of 70 colonies/100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 208 colonies/100 mL.

- The **miscellaneous marine water uses** are wildlife habitat, harvesting, commerce and navigation, boating, and aesthetics.

- Inner Budd Inlet is listed on the 303(d) list as impaired for low dissolved oxygen, fecal coliform, temperature and ammonia-N for water and benzo(a)anthracene, benzo(b)fluorene, benzo(k)fluorene, chrysene, and polychlorinated bi-phenols (PCBs) for tissue.

- Ecology is currently developing a total maximum daily load (TMDL) for the Deschutes River, Capitol Lake, and Budd Inlet for temperature, fecal coliform bacteria, dissolved oxygen, pH, PCBs, and phosphorus. This discharge would not adversely affect the waterbodies ability to meet standards for the listed parameters.

D. Evaluation of Surface Water Quality -Based Effluent Limits for Numeric Criteria

pH--The proposed permit includes a limit based on the technology-based limits of 6.0 to 9.0 s.u. Ecology conducted a reasonable potential calculation to determine if a technology based permit limit of 6-9 s.u. will cause water quality violations for pH.

LOTT's mixing study report included the critical acute and chronic dilution factors of 35.3 and 48.9 for its outfall, respectively (Draft Mixing Zone Dye Tracer Report, February 2009, by Cosmopolitan Engineering Group, Inc.). Ecology used a chronic factor of 9 to conduct the reasonable potential calculations to determine compliance.

The reasonable potential calculations showed the technology based limits of 6.0-9.0 will not cause pH water quality violations. These calculations are shown in Appendix C.

Turbidity--The permit will have a technology based limits for TSS. Ecology expects no violations of the turbidity criteria because of the low technology based permit limits for TSS.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require Ecology to place limits in NPDES permits on toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. Ecology does not exempt facilities with technology-based effluent limits from meeting the surface water quality standards.

The following toxic pollutants are present in the discharge: Copper and PCP.

Copper--The previous permit required CPC to measure the copper concentration in the pump and treat effluent. Ecology evaluated the copper results from October 2002 to October 2009. This review showed the copper results were non-detect with a quantitation level of 2.0 µg/L. The Port only measured copper concentrations above the quantitation level in January 2003, July 2004 and March 2006 at 10 µg/L, 3.0 µg/L and 3.0 µg/L, respectively. The marine chronic water quality criterion for copper is 3.1 µg/L.

Since the copper concentration of 10 µg/L was measured in January 2003, the reasonable potential calculation was conducted to determine if permit limit is required for copper. The calculation in Appendix C showed there is no reasonable potential for this effluent to violate copper water quality criterion of 3.1µg/L. The critical dilution factors used to conduct reasonable potential calculations were 2 for acute and 3 for chronic.

The acute and chronic dilution factors of 35.3 and 48.9 were calculated for the LOTT's outfall, respectively (Draft Mixing Zone Dye Tracer Report, February 2009, by Cosmopolitan Engineering Group, Inc.). The dilution factors used to conduct reasonable potential calculations were 2 for acute and 3 for chronic for the pump and treat outfall.

The copper monitoring requirement will be removed from the permit. The Permittee will characterize the effluent for copper with the permit application for permit renewal in the next permit cycle.

Pentachlorophenol--The previous permit limits for PCP were 6.5 µg/L for the monthly average and 8.2 µg/L for the daily maximum. Ecology developed these limits based on a combination of performance based and water quality criteria for PCP.

Ecology reviewed the PCP data from October 2002 to July 2009. This review showed the PCP results were non-detect with quantitation level of 0.10 µg/L. Since PCP is the chemical of concern at this site, Ecology decided to maintain the previous permit limit of 6.5 µg/L daily maximum in the proposed permit.

The proposed permit limit is lower than acute (13 µg/L) and chronic (7.9 µg/L) water quality standards and lower than the human health criteria (8.20 µg/L) for PCP.

The previous permit included a 99.5 percent treatment system removal efficiency requirement for PCP. This requirement is also included in the proposed permit.

E. Whole Effluent Toxicity

The water quality standards for surface waters forbid discharge of effluent that causes toxic effects in the receiving waters. Many toxic pollutants cannot be measured by commonly available detection methods. However, laboratory tests can measure toxicity directly by exposing living organisms to the wastewater and measuring their responses. These tests measure the aggregate toxicity of the whole effluent, so this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

The Port of Olympia has tested the effluent for eight quarters in 1993, 1994, 2002 and 2003 as a part of the previous permit requirement. It also characterized the effluent in the summer and winter of 2009 as a part of effluent characterization required by the previous permit. Based on these test results, the effluent has not shown any acute or chronic toxicity. The WET toxicity results are in Appendix C.

Ecology determined that toxic effects caused by unidentified pollutants in the effluent are unlikely. Therefore, the proposed permit eliminated routine WET testing. Ecology may require WET testing in the future, if it receives information indicating that toxicity may be present in this effluent.

The proposed permit does require the Port to retest the effluent for whole effluent toxicity during last summer and winter in the last year of the permit. The acute critical effluent concentration (ACEC) is defined as 5.46 percent of effluent which is equal to LOTT's ACEC. The laboratory conducting the WET testing must use 5.46 percent effluent in the dilution series.

F. Human Health

Washington's water quality standards include 91 numeric human health-based criteria that Ecology must consider when writing NPDES permits. These criteria were established in 1992 by the U.S. EPA in its National Toxics Rule (40 CFR 131.36). The National Toxics Rule allows states to use mixing zones to evaluate whether discharges comply with human health criteria.

Ecology determined the effluent may contain chemicals of concern posing a risk to human health. Ecology determined this because data or process information indicates regulated chemicals occur in the discharge.

Ecology conducted a determination of the discharge's potential to violate the water quality standards as required by 40 CFR 122.44(d) by following the procedures published in the Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001) and Ecology's Permit Writer's Manual (Ecology Publication 92-109, July, 2006) to make this reasonable potential determination.

The following are reasonable potential determination for each chemical of concern:

Total Polynuclear Aromatic Hydrocarbons (PAHs) -- The previous permit defined Total PAHs as a summation of 16 chemicals. The previous permit limit was 48 µg/L for Total PAHs. Of the 16 PAHs, seven of the chemicals are defined as carcinogenic polynuclear aromatic hydrocarbons (cPAHs). The cPAHs compounds include Benzo(a)pyrene, Benzo(a)anthracene, Benzo(b)fluoranthene,

Benzo(k)fluoranthene, Chrysene, Dibenzo(a,h)anthracene, and Indeno(1,2,3-cd)pyrene. For marine water, each cPAH has a human health quality criterion of 0.031 µg/L. Therefore, cPAHs are the limiting parameters in setting permit limits.
Ecology's review of the DMRs from December 2002 to July 2009 showed non-detect with a quantitation level of 1.6 µg/L for PAHs. The detailed review of the effluent data has shown each PAH was measured to be non-detect with a quantitation level of 0.10 µg/L. The Port used EPA Method 8270, Selected Ion Monitoring (SIM) to test for PAHs.

Benzo(a)pyrene will be used as an indicator parameter for cPAHs removal. The proposed permit does not include a limit for Benzo(a)pyrene but does include a reporting requirement. Ecology will also require a report to be submitted within one years of permit issuance. The report will have one years of effluent data with method detection limit and quantitation level for Benzo(a)pyrene measurements with Method 8270 SIM. This would provide information to the permit writer to determine compliance with human health marine water criteria of 0.031 µg/L and/or set a permit limit.

Pentachlorophenol (PCP)--The proposed permit retains the daily maximum limit of 6.5 µg/L from the previous permit. The proposed permit limit is lower than human health criteria for PCP of 8.2 µg/L.

2,3,7,8-Tetrachloro dibenzo-p-dioxin (2,3,7,8-TCDD)--The previous permit required the Port to measure 2,3,7,8-TCDD two times during the first year of the permit. The permit specified the quantitation level of 10 picogram/liter (pg/L). The test results for TCDD were non-detect at quantitation level of 10 pg/L and detection levels of 2.7086 pg/L and 3.4471 pg/L. Therefore, the proposed permit does not include a limit for 2,3,7,8-TCDD. The Port tested the effluent using EPA Method 1613B.

The proper operation of the groundwater treatment system with solids removal should ensure 2,3,7,8-TCDD removal from the influent. Ecology has established technology based limits for TSS, therefore, the TSS permit limits should also ensure removal of 2,3,7,8-TCDD.

G. Sediment Quality

The aquatic sediment standards (WAC 173-204) protect aquatic biota and human health. Under these standards Ecology may require a facility to evaluate the potential for its discharge to cause a violation of sediment standards (WAC 173-204-400). You can obtain additional information about sediments at the Aquatic Lands Cleanup Unit website. http://www.ecy.wa.gov/programs/tcp/smu/sediment.html

Through a review of the effluent characteristics, Ecology determined that this discharge has no reasonable potential to violate the Sediment Management Standards.

H. Ground Water Quality Limits

The Ground Water Quality Standards, (chapter 173-200 WAC), protect beneficial uses of ground water. Permits issued by Ecology must not allow violations of those standards (WAC 173-200-100).

The Port of Olympia does not discharge treated groundwater to ground and therefore Ecology imposed no permit limits to protect ground water.

I. Comparison of Effluent Limits with Limits of the Previous Permit Issued on September 26, 2002

The pH range has increased from 7.0-8.5 s.u. to 6.0-9.0 s.u. The new range would not cause water quality criteria violation for pH. The reasonable potential calculations are shown in Appendix C.

Table 6 - Comparison of Effluent Limits for the Groundwater Treatment System Effluent

Parameter	Basis of Limit	Previous Effluent Limits: Outfall # 001		Proposed Effluent Limits: Outfall # 001	
		Average Monthly	Maximum Daily	Average Monthly	Maximum Daily
Total Polynuclear Aromatic Hydrocarbons	Technology	48 µg/L	48 µg/L	-	-
Benzo(a)pyrene	Technology	-	-	Report	
Pentachlorophenol	Water Quality	6.5 µg/L	8.2 µg/L	-	6.5 µg/L
Pentachlorophenol	Technology	99.5 percent Removal Efficiency		99.5 percent Removal Efficiency	
Total Suspended Solids	Technology	Report		6 mg/L	15 mg/L
pH	Water Quality	7.0-8.5 s.u.		6.0-9.0 s.u.	
Copper	Technology	Report		-	

Table 7 - Effluent Limits for the Stormwater during North Point/Phase III Area Soil Remediation

Parameter	Basis of Limit	Proposed Effluent Limits: Outfall # 002	
		Average Monthly	Maximum Daily
Benzo(a)pyrene	Technology	Report	
Pentachlorophenol	Water Quality	-	6.5 µg/L
Pentachlorophenol	Technology	99.5 percent Removal Efficiency	
Total Suspended Solids	Technology	6 mg/L	15 mg/L
pH	Water Quality	6.0-9.0 s.u.	

IV. MONITORING REQUIREMENTS

Ecology requires monitoring, recording, and reporting (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and that the discharge complies with the permit's effluent limits.

The monitoring schedule is detailed in the proposed permit under Condition S.2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring.

A. Lab Accreditation

Ecology requires that facilities must use a laboratory registered or accredited under the provisions of chapter 173-50 WAC, *Accreditation of Environmental Laboratories* to prepare all monitoring data (with the exception of certain parameters).

B. Effluent Limits which are Near Detection or Quantitation levels

The water quality-based effluent concentration limits for Benzo(a)pyrene are near the limits of current analytical methods to detect or accurately quantify. The method detection level (MDL) is the minimum concentration of a pollutant that can be measured and reported with a 99 percent confidence that its concentration is greater than zero (as determined by a specific laboratory method). The quantitation level is the level at which concentrations can be reliably reported with a specified level of error. Estimated concentrations are the values between the MDL and the QL. Ecology requires estimated concentrations to be reported. When reporting maximum daily effluent concentrations, Ecology requires the facility to report "less than X" where X is the required detection level if the measured effluent concentration falls below the detection level. When calculating average monthly concentrations, the facility must use all the effluent concentrations measured below the quantitation level but above the method detection Level.

V. OTHER PERMIT CONDITIONS

A. Reporting and Recordkeeping

Ecology based permit condition S3 on our authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

B. Non Routine and Unanticipated Discharges

Occasionally, this facility may generate wastewater which was not characterized in the permit application because it is not a routine discharge and was not anticipated at the time of application. These wastes typically consist of waters used to pressure-test storage tanks or fire water systems or of leaks from drinking water systems.

The permit authorizes non-routine and unanticipated discharges under certain conditions. The facility must characterize these waste waters for pollutants and examine the opportunities for reuse. Depending on the nature and extent of pollutants in this wastewater and on any opportunities for reuse, Ecology may:

- Authorize the facility to discharge the wastewater.
- Require the facility to treat the wastewater.
- Require the facility to reuse the wastewater.

C. Spill Plan/ Stormwater Pollution Prevention Plan/ Best Management Practices

This facility stores a quantity of chemicals on-site and used activated carbon that has the potential to cause water pollution if accidentally released. Ecology can require a facility to develop best management plans to prevent this accidental release [section 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and RCW 90.48.080].

The proposed permit requires this facility to develop and implement a plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs.

The Port of Olympia developed a plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs during the last permit cycle. The proposed permit requires the facility to update this plan and submit it to Ecology for review and approval.

The facility will be required to submit a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP should be prepared in accordance with Guidance Manual for Preparing/Updating a Stormwater Pollution Prevention Plan for Industrial Facilities, dated April 2004.

D. Engineering Design Report for North Point/Phase III Construction/Remediation

The Permittee submitted an engineering design report. Ecology has reviewed and approved this report. This report includes a detailed description of remediation/excavation processes. In addition, this report includes stormwater pollution prevention plan and best management practices and conceptual stormwater treatment system.

E. Solid Waste Control Plan

The Port of Olympia could cause pollution of the waters of the state through inappropriate disposal of solid waste or through the release of leachate from solid waste.

The proposed permit requires this facility to submit an updated solid waste control plan designed to prevent solid waste from causing pollution of waters of the state. The plan must be submitted to Ecology for approval (RCW 90 48.080).

A guidance document (focus sheet) to help to write the solid waste control plan is in: http://www.ecy.wa.gov/pubs/0710024.pdf.

F. Treatment System Operating and Maintenance Plan

Ecology requires industries to take all reasonable steps to properly operate and maintain their wastewater treatment system in accordance with state and federal regulations (40 CFR 122.41(e) and WAC 173-220-150 (1)(g)).

The facility will update and revise the existing operation and maintenance manual as required by state regulation for the construction of wastewater treatment facilities (WAC 173-240-150). Implementation of the procedures in the Treatment System Operating Plan ensures the facility's compliance with the terms and limits in the permit.

G. Engineering Design Report and Operating and Maintenance Plan

The permit requires the Permittee to submit an engineering design report and operating and maintenance manual for the treatment plant that will be used to treat stormwater runoff during North Point/Phase III area soil remediation/construction.

H. General Conditions

Ecology bases the standardized General Conditions on state and federal law and regulations. They are included in all individual industrial NPDES permits issued by Ecology.

VI. PERMIT ISSUANCE PROCEDURES

A. Permit Modifications

Ecology may modify this permit to impose numerical limits, if necessary to comply with water quality standards for surface waters, with sediment quality standards, or with water quality standards for ground

waters, after obtaining new information from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

Ecology may also modify this permit to comply with new or amended state or federal regulations.

B. Proposed Permit Issuance

This proposed permit includes all statutory requirements for Ecology to authorize a wastewater discharge. The permit includes limits and conditions to protect human health and aquatic life, and the beneficial uses of waters of the state of Washington. Ecology proposes to issue this permit for a term of five years.

VII. REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

Tsivoglou, E.C., and J.R. Wallace.

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology.

1994. Permit Writer's Manual. Publication Number 92-109

Washington State Department of Ecology.

2007. Focus Sheet on Solid Waste Control Plan, Developing a Solid Waste Control Plan for Industrial Wastewater Discharge Permittees. Publication Number 07-10-024

Washington State Department of Ecology.

Laws and Regulations(http://www.ecy.wa.gov/laws-rules/index.html)

Permit and Wastewater Related Information
(http://www.ecy.wa.gov/programs/wq/wastewater/index.html

Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

Ecology proposes to reissue a permit to the Port of Olympia Cascade Pole Remediation Olympia. The permit prescribes operating conditions and wastewater discharge limits. This fact sheet describes the facility and Ecology's reasons for requiring permit conditions.

Ecology placed a Public Notice of Application on June 4, 2009, and June 12, 2009, in the *Olympian* to inform the public about the submitted application and to invite comment on the reissuance of this permit.

Ecology will place a Public Notice on date in the *Olympian* to inform the public and to invite comment on the proposed reissuance of this National Pollutant Discharge Elimination System permit as drafted.

The Notice –

- Tells where copies of the draft Permit and Fact Sheet are available for public evaluation (a local public library, the closest Regional or Field Office, posted on our website.).
- Offers to provide the documents in an alternate format to accommodate special needs.
- Asks people to tell us how well the proposed permit would protect the receiving water.
- Invites people to suggest fairer conditions, limits, and requirements for the permit.
- Invites comments on Ecology's determination of compliance with antidegradation rules.
- Urges people to submit their comments, in writing, before the end of the comment period
- Tells how to request a public hearing about the proposed NPDES Permit.
- Explains the next step(s) in the permitting process.

Ecology has published a document entitled **Frequently Asked Questions about Effective Public Commenting** which is available on our website at http://www.ecy.wa.gov/biblio/0307023.html.

You may obtain further information from Ecology by telephone, 360-407-6280, or by writing to the permit writer at the address listed below.

Water Quality Permit Coordinator
Department of Ecology
Southwest Regional Office
P.O. Box 47775
Olympia, WA 98504-7775

The primary author of this permit and fact sheet is Mohsen Kourehdar, P.E .

APPENDIX B--GLOSSARY

1-DMax or **1-day maximum temperature**--The highest water temperature reached on any given day. This measure can be obtained using calibrated maximum/minimum thermometers or continuous monitoring probes having sampling intervals of thirty minutes or less.

7-DADMax or **7-day average of the daily maximum temperatures**--The arithmetic average of seven consecutive measures of daily maximum temperatures. The 7-DADMax for any individual day is calculated by averaging that day's daily maximum temperature with the daily maximum temperatures of the three days prior and the three days after that date.

Acute Toxicity--The lethal effect of a compound on an organism that occurs in a short period of time, usually 48 to 96 hours.

AKART--The acronym for "all known, available, and reasonable methods of prevention, control and treatment." AKART is a technology-based approach to limiting pollutants from wastewater discharges which requires an engineering judgment and an economic judgment. AKART must be applied to all wastes and contaminants prior to entry into waters of the state in accordance with RCW 90.48.010 and 520, WAC 173-200-030(2)(c)(ii), and WAC 173-216-110(1)(a).

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Ammonia--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Annual Average Design Flow (AADF)--The average of the daily flow volumes anticipated to occur over a calendar year.

Average Monthly Discharge Limit--The average of the measured values obtained over a calendar month's time.

Best Management Practices (BMPs)--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD_5--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD_5 is used in modeling to measure the reduction of dissolved oxygen in receiving waters after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of a treatment facility.

Chlorine--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity--The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Compliance Inspection - Without Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations. In addition it includes as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Ecology may conduct additional sampling.

Composite Sample--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots.

Construction Activity--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Continuous Monitoring –Uninterrupted, unless otherwise noted in the permit.

Critical Condition--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Detection Limit--See Method Detection Level.

Dilution Factor (DF)--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10 percent by volume and the receiving water 90 percent.

Engineering Report--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report must contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample--A single sample or measurement taken at a specific time or over as short a period of time as is feasible.

Industrial Wastewater--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Major Facility--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limit--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Maximum Day Design Flow (MDDF) --The largest volume of flow anticipated to occur during a one-day period, expressed as a daily average.

Maximum Month Design Flow (MMDF) --The largest volume of flow anticipated to occur during a continuous 30-day period, expressed as a daily average.

Maximum Week Design Flow (MWDF) --The largest volume of flow anticipated to occur during a continuous 7-day period, expressed as a daily average.

Method Detection Level (MDL) --The minimum concentration of a substance that can be measured and reported with 99 percent confidence that the pollutant concentration is above zero and is determined from analysis of a sample in a given matrix containing the pollutant.

Minor Facility--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone--An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in state regulations (chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

pH--The pH of a liquid measures its acidity or alkalinity. It is the negative logarithm of the hydrogen ion concentration. A pH of 7.0 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Peak Hour Design Flow (PHDF) --The largest volume of flow anticipated to occur during a one-hour period, expressed as a daily or hourly average.

Peak Instantaneous Design Flow (PIDF) --The maximum anticipated instantaneous flow.

Quantitation Level (QL) --The smallest detectable concentration of analyte greater than the Detection Limit (DL) where the accuracy (precision &bias) achieves the objectives of the intended purpose. This may also be called Minimum Level or Reporting Level.

Reasonable Potential--A reasonable potential to cause a water quality violation, or loss of sensitive and/or important habitat.

Responsible Corporate Officer--A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or have gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

Technology-based Effluent Limit--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)--Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to receiving waters may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Solid waste--All putrescible and non-putrescible solid and semisolid wastes including, but not limited to, garbage, rubbish, ashes, industrial wastes, swill, sewage sludge, demolition and construction wastes, abandoned vehicles or parts thereof, contaminated soils and contaminated dredged material, and recyclable materials.

State Waters--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

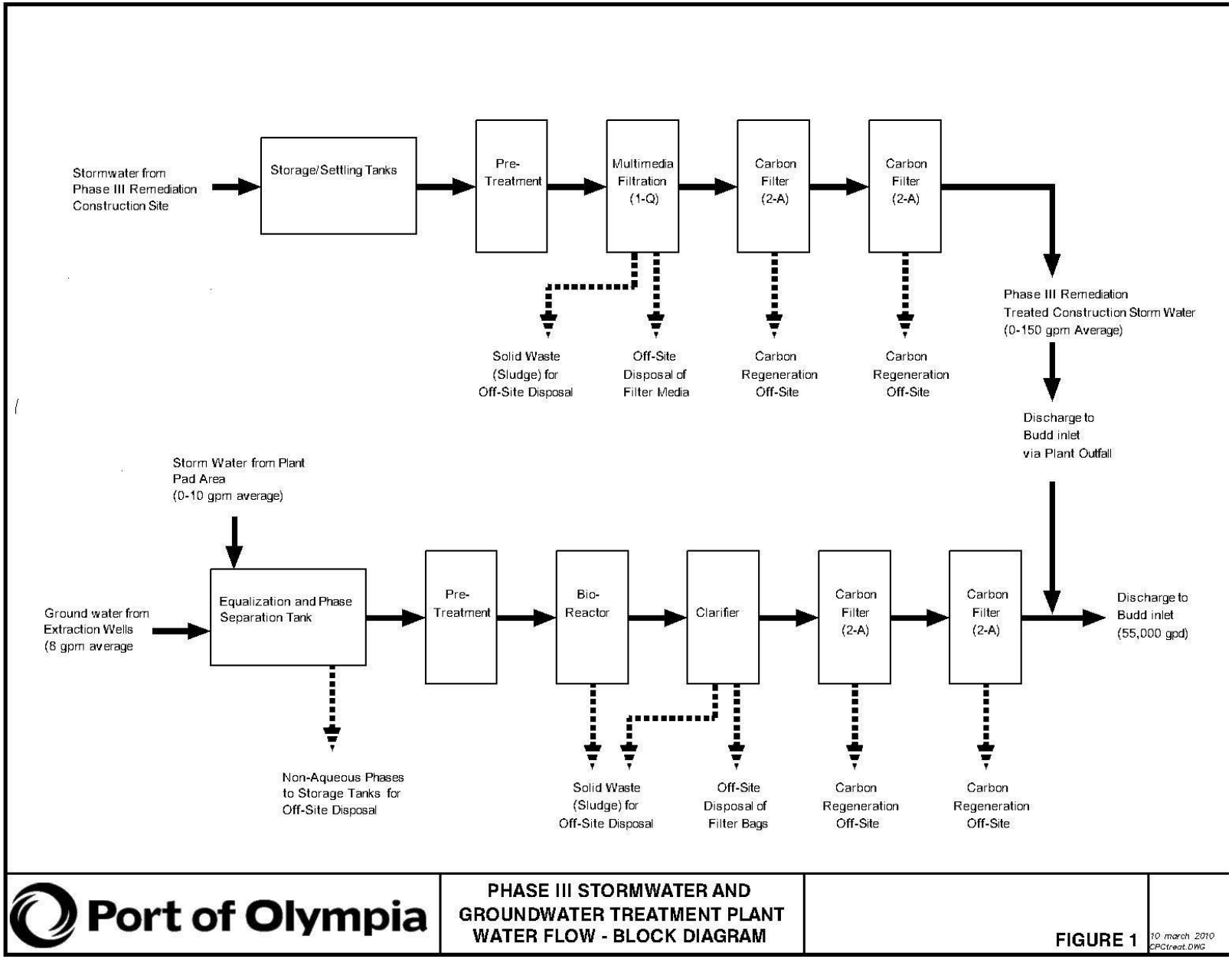
Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Upset--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the facility. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit--A limit on the concentration of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into receiving waters.

APPENDIX C--TECHNICAL CALCULATIONS/FIGURE 1

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on Ecology's homepage at http://www.ecy.wa.gov/programs/eap/pwspread/pwspread.html.



Port of Olympia

PHASE III STORMWATER AND GROUNDWATER TREATMENT PLANT WATER FLOW - BLOCK DIAGRAM

FIGURE 1

10 march 2010
CPCtreat.DWG

Calculation of pH of a mixture in seawater.
Based on the CO2SYS program (Lewis and Wallace, 1998)
http://cdiac.esd.ornl.gov/oceans/co2rprt.html

INPUT

1. MIXING ZONE BOUNDARY CHARACTERISTICS	
Dilution factor at mixing zone boundary	9.000
Depth at plume trapping level (m)	2.000
2. BACKGROUND RECEIVING WATER CHARACTERISTICS	
Temperature (deg C):	18.00
pH:	8.00
Salinity (psu):	29.00
Total alkalinity (meq/L)	2.30
3. EFFLUENT CHARACTERISTICS	
Temperature (deg C):	18.30
pH:	9.00
Salinity (psu)	0.00
Total alkalinity (meq/L):	3.00

4. CLICK THE 'calculate" BUTTON TO UPDATE OUTPUT RESULTS >>> calculate

OUTPUT

CONDITIONS AT THE MIXING ZONE BOUNDARY	
Temperature (deg C):	18.03
Salinity (psu)	25.78
Density (kg/m^3)	1018.23
Alkalinity (mmol/kg-SW):	2.34
Total Inorganic Carbon (mmol/kg-SW):	2.10
pH at Mixing Zone Boundary:	**8.13**

Ambient Background Information from the report titled "Mixing Zone Dye Study for LOTT, dated February 2009, By Cosmopolitan Engineering Group, Inc."

Water Quality Criteria for pH 7-8.5 su

Calculation of pH of a mixture in seawater.
Based on the CO2SYS program (Lewis and Wallace, 1998)
http://cdiac.esd.ornl.gov/oceans/co2rprt.html

INPUT

1. MIXING ZONE BOUNDARY CHARACTERISTICS	
Dilution factor at mixing zone boundary	9.000
Depth at plume trapping level (m)	2.000
2. BACKGROUND RECEIVING WATER CHARACTERISTICS	
Temperature (deg C):	18.00
pH:	8.00
Salinity (psu):	29.00
Total alkalinity (meq/L)	2.30
3. EFFLUENT CHARACTERISTICS	
Temperature (deg C):	18.30
pH:	6.00
Salinity (psu)	0.00
Total alkalinity (meq/L):	3.00

4. CLICK THE 'calculate" BUTTON TO UPDATE OUTPUT RESULTS >>> calculate

OUTPUT

CONDITIONS AT THE MIXING ZONE BOUNDARY	
Temperature (deg C):	18.03
Salinity (psu)	25.78
Density (kg/m^3)	1018.23
Alkalinity (mmol/kg-SW):	2.34
Total Inorganic Carbon (mmol/kg-SW):	2.52
pH at Mixing Zone Boundary:	**7.01**

Ambient Background Information from the report titled "Mixing Zone Dye Study for LOTT, dated February 2009, By Cosmopolitan Engineering Group, Inc."

Water Quality Criteria for pH 7-8.5 su

This spreadsheet calculates the reasonable potential to exceed state w ater quality standards for a small number of samples. The procedure and calculations are done per the procedure in Technical Support Document for Water Quality-based Toxics Control, U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 56. User input columns are show n w ith red headings. Corrected formulas in col G and H on 5/98 (GB)/

Port of Olympia, WA0040533

CALCULATIONS

				State Water Quality Standard		Max concentration at edge of...												
	Metal Criteria Translator as decimal	Metal Criteria Translator as decimal	Ambient Concentration (metals as dissolved)	Acute	Chronic	Acute Mixing Zone	Chronic Mixing Zone	LIMIT REQ'D?	Effluent percentile value		Max effluent conc. measured (metals as total recoverable)	Coeff Variation		# of samples	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor	
Parameter	Acute	Chronic	*ug/L*	*ug/L*	*ug/L*	*ug/L*	*ug/L*			*Pn*	*ug/L*	*CV*	*S*	*n*				COMMENTS
Copper	0.95	0.95	0.3900	4.8000	3.1000	3.88	2.71	NO	0.95	0.982	10.00	0.60	0.55	168	0.78	2	3	

mples are seven years of bi-weekly sampling

PERFORMANCE-BASED EFFLUENT LIMITS

USE EXCEL TO PERFORM THE LOGNORMAL TRANSFORMATION

AND CALCULATE THE TRANSFORMED MEAN AND VARIANCE

Total Suspended Solids, Cascade Pole/The Port of Olympia Nov-09

LOGNORMAL TRANSFORMED MEAN =	0.2280
LOGNORMAL TRANSFORMED VARIANCE =	1.1360
NUMBER OF SAMPLES/MONTH FOR COMPLIANCE MONITORING =	2
AUTOCORRELATION FACTOR(ne)(USE 0 IF UNKNOWN) =	0
E(X) =	2.2167
V(X) =	10.389
VARn	0.7213
MEANn=	0.4353
VAR(Xn)=	5.194
MAXIMUM DAILY EFFLUENT LIMIT =	14.986
AVERAGE MONTHLY EFFLUENT LIMIT =	6.249

6.249159 5.965793

	LN		LN		LN		LN
0.5	-0.6931472	2	0.6931472	6	1.7917595	1.7	0.5306283
1.75	0.5596158	3.5	1.252763	3	1.0986123	1	0
2.25	0.8109302	3.3	1.1939225	1	0	1.3	0.2623643
6.8	1.9169226	2.5	0.9162907	7.5	2.014903	0.7	-0.3566749
1	0	0.7	-0.3566749	4.4	1.4816045	7.5	2.014903
1.25	0.2231436	0.9	-0.1053605	0.25	-1.3862944	2	0.6931472
0.5	-0.6931472	0.35	-1.0498221	0.25	-1.3862944	0.25	-1.3862944
2	0.6931472	0.75	-0.2876821	15	2.7080502	1	0
1.5	0.4054651	8	2.0794415	18	2.8903718	1.7	0.5306283
1.5	0.4054651	1.5	0.4054651	1	0	1.3	0.2623643
1	0	0.25	-1.3862944	0.7	-0.3566749	6.3	1.8405496
1.5	0.4054651	0.5	-0.6931472	2	0.6931472	1.5	0.4054651
1.6	0.4700036	3.5	1.252763	0.8	-0.2231436	2.5	0.9162907
1	0	0.3	-1.2039728	0.25	-1.3862944	0.25	-1.3862944
1.5	0.4054651	1.1	0.0953102	0.25	-1.3862944	1	0
1	0	0.25	-1.3862944	7	1.9459101	2	0.6931472
0.25	-1.3862944	1.15	0.1397619	3	1.0986123	1.2	0.1823216
3	1.0986123	0.25	-1.3862944	8	2.0794415	2	0.6931472
3.8	1.3350011	0.65	-0.4307829	2.2	0.7884574		
2.5	0.9162907	0.75	-0.2876821	0.7	-0.3566749		
0.75	-0.2876821	0.83	-0.1863296	1.7	0.5306283		
4.55	1.5151272	0.07	-2.65926	1.7	0.5306283		
2.45	0.896088	2	0.6931472	1	0		
0.5	-0.6931472	1.35	0.3001046	1.5	0.4054651		
0.5	-0.6931472	0.25	-1.3862944	2	0.6931472		
8.5	2.1400662	0.35	-1.0498221	3	1.0986123		
9.2	2.2192035	0.45	-0.7985077	1	0		
0.85	-0.1625189	0.45	-0.7985077	1	0		
0.7	-0.3566749	3.63	1.2892326	0.5	-0.2231436		
1.5	0.4054651	1.5	0.4054651	0.25	-1.3862944		
0.33	-1.1086626	0.75	-0.2876821	1	0		
0.25	-1.3862944	0.25	-1.3862944	1	0		
0.25	-1.3862944	0.4	-0.9162907	1	0		
2	0.6931472	0.7	-0.3566749	1	0		
0.9	-0.1053605	0.85	-0.1625189	1	0		
4.65	1.5368672	1.17	0.1570037	1	0		

Column1	
Mean	0.2285686
Standard Err	0.0794493
Median	0.0430888
Mode	0
Standard De	1.0659237
Sample Varia	1.1361933
Kurtosis	-0.0037681
Skew ness	0.1189928
Range	5.7037825
Minimum	-2.65926
Maximum	3.0445224

Port of Olympia Acute WET test Results as NOEC/LOEC in % Effluent

Test Code	Collected	Start Date	Organism	Endpoint	NOEC	LOEC	PMSD
			Atlantic	48-hour			16.84
aSSIN504	6/8/1993	6/9/1993	Mysid	Survival	20	40	%
			Inland	96-hour			
aSSIN505	6/8/1993	6/9/1993	Silverside	Survival	< 5	5	9.56%
			Atlantic	48-hour			
RMAR0036	9/8/1993	9/9/1993	Mysid	Survival	100	> 100	2.50%
			Inland	96-hour			16.85
RMAR0035	9/8/1993	9/9/1993	Silverside	Survival	< 6.25	6.25	%
			Inland	96-hour			19.79
RMAR0031	12/6/1993	12/7/1993	Silverside	Survival	50	100	%
			Atlantic	48-hour			
RMAR0032	12/10/1993	12/10/1993	Mysid	Survival	100	> 100	2.50%
			Atlantic	96-hour			
RMAR0025	3/28/1994	3/29/1994	Mysid	Survival	50	100	9.71%
			Inland	96-hour			15.53
RMAR0026	3/28/1994	3/29/1994	Silverside	Survival	50	100	%
			Daphnia	48-hour			
RMAR0167	12/4/2002	12/4/2002	*magna*	Survival	50	100	6.03%
			Fathead	96-hour			15.41
RMAR0168	12/4/2002	12/4/2002	Minnow	Survival	100	> 100	%
AQTX00332			*Daphnia*	48-hour			25.08
7	6/16/2003	6/17/2003	*magna*	Survival	100	> 100	%
AQTX00332			Fathead	96-hour			
8	6/16/2003	6/17/2003	Minnow	Survival	100	> 100	9.30%
			Daphnia	48-hour			
khan020	12/5/2003	12/6/2003	*magna*	Survival	100	> 100	5.00%
			Fathead	96-hour			
khan021	12/5/2003	12/6/2003	Minnow	Survival	100	> 100	9.95%
			Daphnia	48-hour			
RMAR1746	10/19/2009	10/20/2009	*magna*	Survival	100	> 100	5.00%
			Fathead	96-hour			
RMAR1745	10/19/2009	10/20/2009	Minnow	Survival	100	> 100	7.15%
			Daphnia	48-hour			
RMAR1818	12/14/2009	12/15/2009	*magna*	Survival	100	> 100	9.20%
			Fathead	96-hour			
RMAR1819	12/14/2009	12/15/2009	Minnow	Survival	100	> 100	5.60%

Port of Olympia Chronic WET test Results as NOEC/LOEC in % Effluent

Test Code	Collected	Start Date	Organism	Endpoint	NOEC	LOEC	PMSD
aSSIN506	6/8/1993	6/9/1993	Atlantic Mysid	7-day Survival	20	40	26.69%
				Biomass	20	40	42.47%
				Weight	40	> 40	57.00%
aSSIN507	6/8/1993	6/9/1993	Inland Silverside	7-day Survival	< 5	5	15.34%
				Biomass	< 5	5	24.01%
				Weight	40	> 40	21.72%
RMAR0037	9/8/1993	9/9/1993	Atlantic Mysid	7-day Survival	100	> 100	15.72%
				Biomass	100	> 100	18.91%
				Weight	100	> 100	16.52%
RMAR0038	9/8/1993	9/9/1993	Inland Silverside	7-day Survival	50	100	28.81%
				Biomass	50	100	28.14%
				Weight	100	> 100	27.59%
RMAR0033	12/6/1993	12/7/1993	Atlantic Mysid	7-day Survival	100	> 100	20.84%
				Biomass	50	100	23.01%
				Weight	50	100	10.85%
RMAR0034	12/6/1993	12/7/1993	Inland Silverside	7-day Survival	100	> 100	13.37%
				Biomass	100	> 100	26.15%
				Weight	100	> 100	23.36%
RMAR0027	3/28/1994	3/29/1994	Atlantic Mysid	7-day Survival	50	100	13.27%
				Biomass	25	50	19.73%
				Weight	25	50	12.84%
RMAR0028	3/28/1994	3/29/1994	Inland Silverside	7-day Survival	50	100	10.20%
				Biomass	50	> 50	22.17%
				Weight	50	> 50	24.50%
RMAR0170	12/16/2002	12/16/2002	Atlantic Mysid	7-day Survival	100	> 100	2.72%
				Biomass	50	100	14.27%
				Weight	50	100	14.07%
RMAR0169	12/16/2002	12/16/2002	Topsmelt	7-day Survival	50	100	8.11%
				Biomass	50	100	18.29%
				Weight	100	> 100	15.30%
AQTX003330	6/16/2003	6/17/2003	Atlantic Mysid	7-day Survival	100	> 100	4.24%
				Biomass	100	> 100	22.47%
				Weight	100	> 100	20.91%
AQTX003329	6/16/2003	6/17/2003	Topsmelt	7-day Survival	100	> 100	13.02%
				Biomass	100	> 100	26.11%
				Weight	100	> 100	25.37%
RMAR1748	10/21/2009	10/21/2009	Atlantic Mysid	7-day	100	> 100	14.91%

				Survival			
				Biomass	100	> 100	18.30%
				Weight	100	> 100	11.38%
			Inland	7-day			
RMAR1747	10/21/2009	10/21/2009	Silverside	Survival	100	> 100	9.38%
				Biomass	100	> 100	22.00%
				Weight	100	> 100	26.82%
				7-day			
RMAR1817	12/14/2009	12/15/2009	Atlantic Mysid	Survival	100	> 100	18.21%
				Biomass	100	> 100	25.39%
				Weight	100	> 100	18.37%
				7-day			
RMAR1820	1/4/2010	1/5/2010	Topsmelt	Survival	100	> 100	29.59%
				Biomass	100	> 100	34.82%
				Weight	100	> 100	26.85%

APPENDIX D--RESPONSE TO COMMENTS